PB82-203340

Draft Environmental Impact Statement Proposed Wastewater Management Program Livermore-Amador Valley, Alameda County, California

Livermore-Amador Valley Wastewater Management Program, Berkeley, California

Prepared for

Environmental Protection Agency
San Francisco, CA

Nov 75

U.S. Department of Commerce
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16. Abstract (Limit: 200 words) The purpose of the current study which includes a detailed engineering study and this Environmental Impact Statement (EIS), is to develop, evaluate, and select a system to meet the waste discharge requirements promulgated by the Regional Water Quality Control Board for the Valley.

Valley wastewater has historically been discharged to natural watercourses, where it either enters Valley groundwater basins or enters surface flows in Alameda Creek and is transported beyond the Valley. Increasing Valley waste discharges to Alameda Creek poses a threat to the quality of the Niles Cone Groundwater Basin.

The goals of improving and protecting water quality must be pursued jointly with the goals of improving and protecting the Valley's Air Quality. However, a wastewater management program accommodating a large increase in population could indirectly lead to the increased degradation in Valley air quality primarily due to increased automotive traffic.

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Air Pollution

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Amador Valley, CA
San Francisco Bay
Environmental Impact Statement
Secondary Effects

c. COSATI Field/Group

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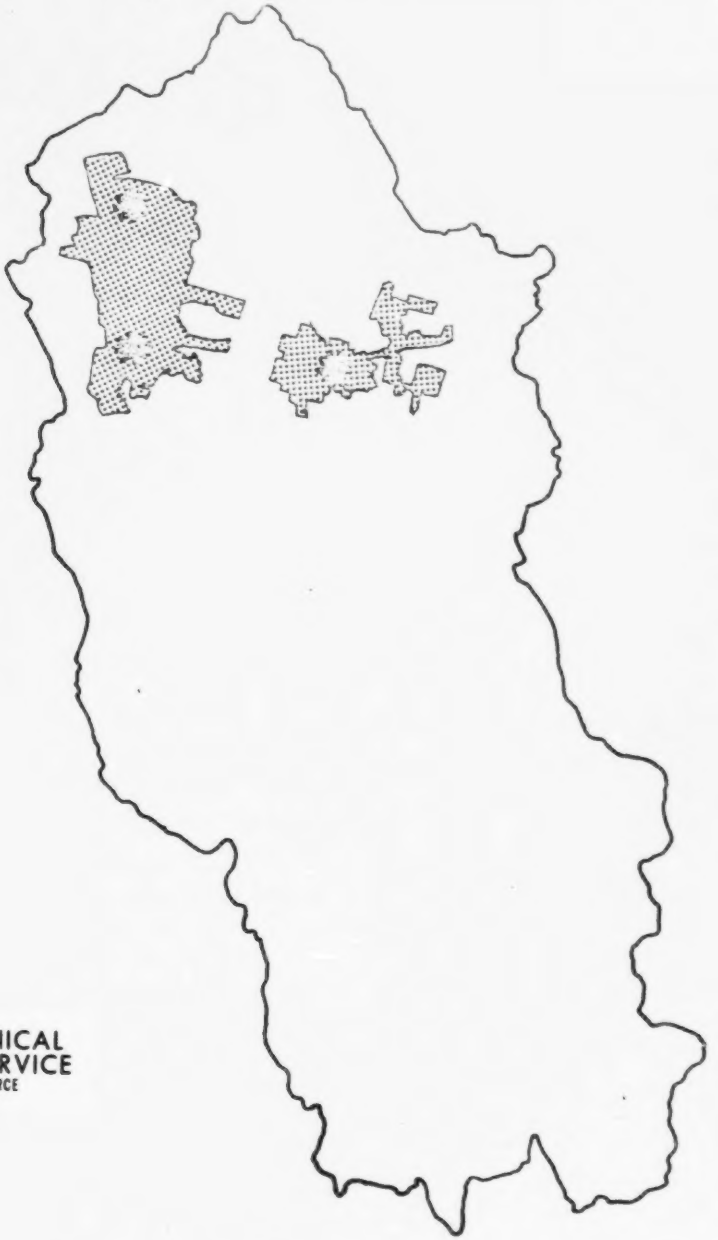
PB82-203340



DRAFT ENVIRONMENTAL IMPACT STATEMENT SUMMARY

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LIVERMORE-AMADOR VALLEY WASTEWATER MANAGEMENT PROGRAM

SUMMARY - DRAFT
ENVIRONMENTAL IMPACT STATEMENT
PROPOSED WASTEWATER MANAGEMENT PROGRAM
LIVERMORE-AMADOR VALLEY, ALAMEDA COUNTY, CALIFORNIA
C-06-1031-010 SCH 740 715 05 NOVEMBER, 1975

PREPARED BY:

United States Environmental Protection Agency
Pacific Southwest Region IX
100 California Street
San Francisco, California 94111

Livermore-Amador Valley Water Management Agency
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RESPONSIBLE OFFICIALS:

Paul De Falco Jr.
Regional Administrator
Environmental Protection Agency
Region IX

Lila Euler
Chairwoman
Livermore-Amador Valley Water
Management Agency

TO ALL INTERESTED AGENCIES, PUBLIC GROUPS, AND CONCERNED INDIVIDUALS:

The following summary Environmental Impact Statement for the Livermore-Amador Valley Water Management Agency (LAVWMA) effluent disposal system is hereby submitted for your review and comment. This statement has been prepared in compliance with the National Environmental Policy Act of 1969 (P.L. 91-190), and implementing regulations promulgated by the Council on Environmental Quality and the Environmental Protection Agency.

I would like to call to your attention the fact that in the process of summarizing the Draft EIS, much of the detail necessary to explain and support the Summary's statements and conclusions was of necessity not presented. While the Summary is as clear and accurate as possible within this limitation, I would encourage those persons desiring a complete presentation of EPA's analysis, conclusions and recommendations to review the complete Draft Environmental Impact Statement at the location cited below.

Comments should be sent to this office within forty-five (45) days of the date of this letter. All comments received will be considered in the preparation of the final Environmental Impact Statement for this action.

In order to receive public comments, the Environmental Protection Agency, Region IX, will hold a public hearing on the Draft EIS on January 13, 1976 at 7:00 PM at the following address:

Shannon Park Community Center
11600 Shannon Avenue
Dublin, California 94566

The hearing may be continued from time to time, or to a different place, after its commencement, to accommodate the needs of witnesses or the EPA.

All interested parties are invited to express their views at this hearing. Persons wishing to make comments may submit same in writing and/or appear at this hearing. Oral statements will be considered, but, for accuracy of the record, all important testimony should be submitted in triplicate to:

Environmental Protection Agency
Attn: Hearings Office
Region IX
100 California Street
San Francisco CA 94111

Enough copies of written material should be produced so that other interested persons may receive a copy and there will not be a necessity for written materials to be read at length. Oral statements should summarize extensive written materials so that there will be time for all interested persons to be heard.

The Draft EIS may be reviewed at:

City of Livermore
Planning Department
2250 First Street
Livermore CA 94550

City of Pleasanton
Planning Department
200 Bernal Avenue
Pleasanton CA 94566

Valley Community Services District
7051 Dublin Blvd.
Dublin CA 94566

Alameda County Planning Department
399 Elmhurst Street
Hayward CA 94544

Livermore Municipal Library
1000 South Livermore Avenue
Livermore CA 94550

Dublin Public Library
6930 Village Parkway
Dublin CA 94566

Pleasanton Public Library
4333 Black Avenue
Pleasanton CA 94566

and at:

Freedom of Information Center
EPA, Room 329
401 "M" Street, S.W.
Washington, DC 20460

Environmental Protection Agency
Region IX Library
100 California Street
San Francisco CA 94111

Please bring this notice to the attention of all persons who would be interested in this matter.

Sincerely,

L. Russell Freeman Dept

for: Paul De Falco, Jr.
Regional Administrator

SUMMARY

NAME OF THE ACTION

The proposed action is known as the Livermore-Amador Valley Wastewater Management Program. It is an

(X) Administrative action,
( ) Legislative action,

under the authority of Public Law 92-500, Section 201.

A BRIEF DESCRIPTION OF THE ACTION

BACKGROUND AND HISTORY

In January 1971, the San Francisco Bay Regional Water Quality Control Board (RWQCB) adopted Order 71-3 requiring a comprehensive water quality management program for the Livermore-Amador Valley. The "Water Quality Management Plan for the Alameda Creek Watershed Above Niles," published in July of 1972, analyzed water resources, consumption and alternative means of wastewater treatment and disposal. On June 18, 1974, VSCD, Pleasanton, and Livermore (the three Valley sewage dischargers) formed the Livermore-Amador Valley Water Management Agency (LAVWMA), a joint powers agency, to implement a wastewater management system. The purpose of the current study which includes a detailed engineering study and this Environmental Impact Statement (EIS), is to develop, evaluate, and select a system to meet the waste discharge requirements promulgated by the Regional Water Quality Control Board for the Valley.

PROBLEM DESCRIPTION

Valley wastewater has historically been discharged to natural watercourses, where it either enters Valley groundwater basins or enters surface flows in Alameda Creek and is transported beyond the Valley. Two factors have combined to place a limit on this practice. Increasing Valley waste discharges to Alameda Creek, which flows westward through Niles Canyon and charges the Niles Cone Groundwater Basin at the mouth of Niles Canyon, pose a threat to the quality of that water supply. Furthermore, there is a danger of degrading the groundwaters within the Livermore-Amador Valley. Order 71-3 of the RWQCB is a mandate to remedy the problem.

AREA AFFECTED

The Livermore-Amador Valley lies within the Diablo Range of northern coastal California between San Francisco Bay on the west and the San Joaquin Valley on the east. The Livermore-Amador Valley is essentially a closed basin, surrounded on four sides by uplands and connected to the San Francisco Bay Area only by Niles Canyon, a narrow valley that cuts through the uplands to the west carrying the waters of Alameda Creek to San Francisco Bay. The metropolitan areas of San Francisco and Oakland lie to the west approximately 35 miles and 20 miles, respectively (see Fig. 1). The city of Stockton in the San Joaquin Valley lies approximately 30 miles to the northeast. The LAVWMA study

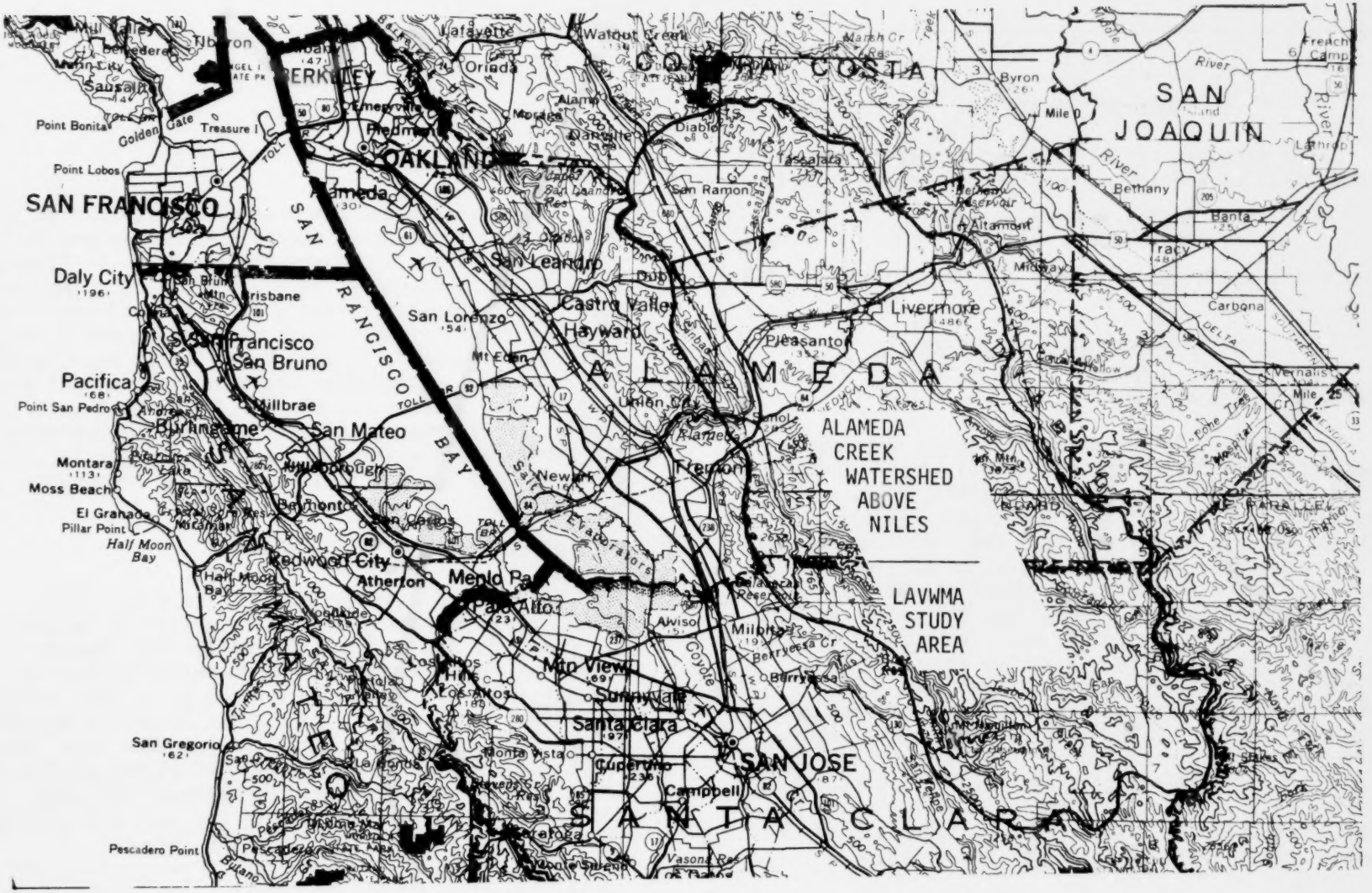


Figure 1. LOCATION OF THE PROGRAM

area referred to in this report is equivalent to the Alameda Creek watershed above the town of Niles. The present LAVWMA service area is restricted to the floor of the Livermore-Amador Valley encompassing the major population centers of the area, the cities of Livermore and Pleasanton and the unincorporated areas of Dublin and San Ramon Village. The projected LAVWMA service area boundaries would be extended to include those areas of anticipated development.

ENVIRONMENTAL GOALS AND CONSTRAINTS

The primary goal of the LAVWMA Wastewater Management Program is to preserve water quality and meet discharge requirements in the Valley, Alameda Creek, and the Niles Cone Groundwater Basin. In accordance with PL 92-500, the Environmental Protection Agency (EPA) and the State Water Resources Control Board (SWRCB) have assisted LAVWMA planning efforts to achieve this goal. However, the EPA has a second mandated goal under the Clean Air Act to protect and preserve the nation's air quality. The Livermore-Amador Valley air basin is within the EPA-designated San Francisco Bay Area Interstate Air Quality Control Region (SFBAIAQCR) and is designated by the California State Air Resources Control Board as a Critical Air Basin. More recently, the EPA has accepted a State determination that the SFBAIAQCR should also be an Air Quality Maintenance Area with the objective of developing an attainment and maintenance plan maximizing local participation. Thus, the goals of improving and protecting water quality must be pursued jointly with the goals of improving and protecting the Valley's air quality. However, a wastewater management program accommodating a large increase in population could indirectly lead to the increased degradation in Valley air quality primarily due to increased automotive traffic. EPA's responsibility is therefore one of balancing the two goals of improving water quality and improving air quality. In addition, the accomplishment of the above goals must consider other environmental constraints in order to minimize the impacts on other aspects of the environment. Areas of particular concern include flood plains, prime agricultural land, archaeological resources, geologic hazards (particularly where pipelines must cross potentially active or known active faults) and biologically sensitive areas (viz, salt marsh, foothill woodlands, and riparian habitat).

THE EIS PROCESS

Preparation of an EIS on this project is required by several of the criteria stated in EPA's April 14, 1975, Final Regulations for the Preparation of Environmental Impact Statements. Basically, an EIS is required because the project is expected to have significant effects on the human environment, specifically water quality, land use, and air quality. Furthermore, the nature and value of these effects is at issue within the project area.

The purpose of this statement is to publicly present all issues surrounding the project's objectives including primary and secondary effects so that they can be resolved as openly and satisfactorily as possible. In keeping with this open policy, the EIS has been developed as part of a decision process to select the most desirable wastewater management alternative and to determine the appropriate system capacity in accordance with local, state, and federal objectives.

THE SELECTED PROJECT

On June 10, 1975 the LAVWMA Board of Directors and EPA selected Alternative 1B as the best apparent wastewater management alternative. This decision was made following the review of the Preliminary Draft Engineering Report and the Preliminary Draft Environmental Impact Statement.

Alternative 1B would continue treatment at the existing Livermore Water Reclamation Plant (WRP) and Valley Community Services District (VCSD) treatment plants, with ultimate discharge into the proposed East Bay Dischargers (EBD) Interceptor. It would require a pipeline from the Livermore WRP to VCSD, and a force main along Interstate 580 to Boehmer Summit on the Dublin Canyon Pass. A gravity pipeline would then carry the flows to the Oro Loma-Castro Valley pumping station of the EBD Interceptor. From there the flows would be conveyed to an outfall at the north end of the Oakland Airport. Major features are indicated in Figure 2.

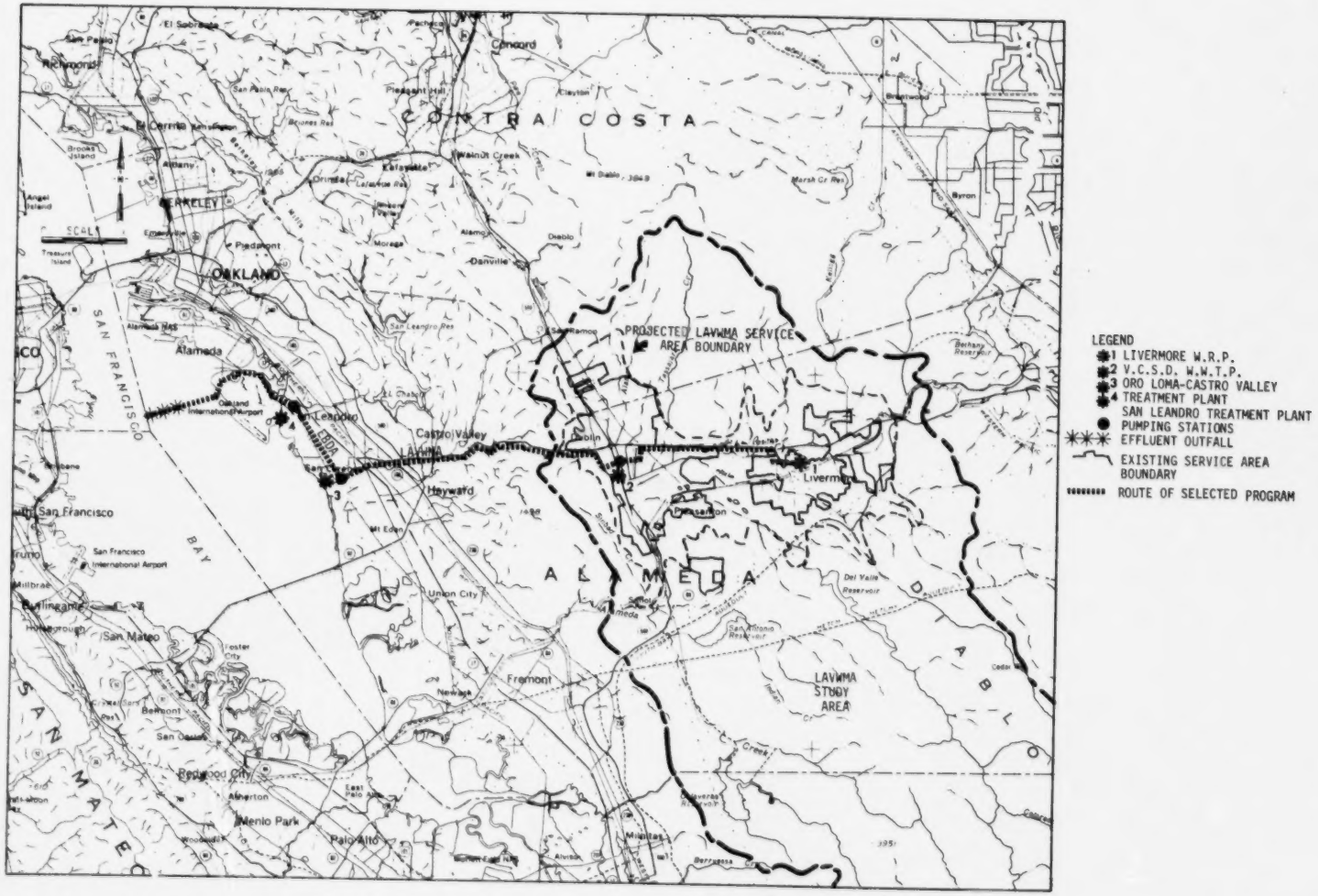


Figure 2

LOCATION OF THE PROGRAM

SUMMARY OF ENVIRONMENTAL IMPACT AND ADVERSE ENVIRONMENTAL EFFECTS

PRIMARY IMPACTS OF SELECTED PROJECT

Primary impacts resulting from the implementation of Alternative 1B are related to pipeline construction (usually short-term impacts) and the operation of the alternative (usually long-term impacts).

Adverse environmental impacts are associated with the construction of a 22-mile pipeline from the VCSD treatment plant in Pleasanton, across the Dublin Canyon Pass (I-580), to the East Bay Dischargers Interceptor in San Lorenzo.

Dust and increased noise levels would be generated by construction equipment along the pipeline route, as well as along the route of the proposed Livermore Interceptor connecting the Livermore treatment plant with the VCSD plant. In rural areas construction activities would have an adverse impact on local vegetation and wildlife, while in urban areas the construction would result in a temporary disturbance to local residents. Especially sensitive are residential areas along Foothill Road in Pleasanton, Mission Boulevard, Lewelling Boulevard, and Grant Avenue in the San Lorenzo area.

Traffic along the pipeline route would be disrupted by trenching and movement of heavy equipment. Major points of disruption, where the pipeline must cross major transportation routes, include I-680 in the vicinity of the VCSD plant, Foothill Road near Gold Creek, Palo Verde Road interchange on I-580, MacArthur Freeway, Mission Boulevard, the BART tracks, Southern Pacific tracks, and the Nimitz Freeway in San Lorenzo. In addition, traffic on numerous arterial and local streets in Castro Valley and San Lorenzo would also be temporarily disrupted. Pipeline construction will have to be coordinated with the ongoing expansion of I-580. Although the proposed pipeline would parallel I-580 but not cross it, movement of construction equipment and workers to and from the project site would also disrupt traffic somewhat along I-580.

The loss or disturbance of riparian woodland vegetation would occur at the Laurel Creek crossing on Foothill Road, and along Palomares Creek east of Don Castro Regional Recreation area. The impacts of riparian vegetation removal are severe because this type of vegetation community and wildlife habitat is becoming increasingly scarce in the Bay Area as urbanization continues and streams become channelized. Some chaparral and foothill woodland plant communities as well as occasional buckeye and coast live oak trees associated with grassland would also be lost along I-580. Because of the heavy use of I-580 which tends to depress the wildlife value in the immediate vicinity of the road, impacts on wildlife due to construction activities of this pipeline are not expected to be significant. However, the construction activities would displace or destroy any wildlife within the immediate vicinity of the construction zone and in the case of woodland removal, would result in a permanent loss of this habitat.

Since much of the pipeline route is in hilly terrain, construction activities would increase the potential for erosion from trench spoils resulting in siltation in streambeds below the project site, particularly if soil is exposed during the rainy season. Streams in which the sediment load may be increased

are Palomares Creek and San Lorenzo Creek and to a lesser extent, Arroyo de la Laguna and Alameda Creek. Some problems of slope stability may also be encountered along the bottom of slopes.

At the eastern end of the I-580 pipeline route, archaeologic remains may be affected by the trenching. Further archaeologic field work and more precise location of the pipeline is needed before the potential impact on archaeologic resources can be adequately evaluated.

The construction of the Alternative 1B pipeline would create an estimated 465 to 499 person-year jobs. This would amount to approximately $7.7 to $8.3 million in direct personal income and approximately $5.8 to $6.2 million of additional secondary personal income. However, it must be assumed that not all of the jobs created by the project would be filled by Livermore-Amador Valley residents. Thus, only an indeterminate percentage of the above income would actually enter the local Valley economy.

The operation of the proposed alternative would have the beneficial environmental impact of meeting water quality guidelines established for Alameda Creek as well as gradually improving the quality of local groundwater basins within the Livermore-Amador Valley and Niles Cone. Elimination of effluent discharges to surface streams would have an adverse impact on wildlife, vegetation, and fish which depend on the flow in Alameda Creek being enhanced by these discharges during the dry (low flow) season. However, the actual extent of the impacts on stream flow would depend on continued management of releases from Calaveras Reservoir, San Antonio Reservoir, Del Valle Reservoir and the South Bay Aqueduct.

Further archaeological field work will be required once the precise location of the pipeline has been defined to adequately determine and evaluate potential impacts on archaeological resources.

Discharge of the treated effluent via the East Bay Dischargers outfall just north of Oakland Airport would result in an increase of approximately 25 percent (based on the ratio of LAVWMA flow/EBD flow) in the size of the projected disturbed zone around the outfall. Species diversity within this zone of the Bay would be diminished as a result of long-term uptake of heavy metals and pesticides. However, there would be no acute toxicity associated with the effluent.

The maximum power demand required to operate three to four 500-HP pumps in order to pump the effluent over the Dublin Canyon Pass is estimated at 7.7 to 10.0 million kilowatt hours per year.

PROPOSED MITIGATION MEASURES

The following is a list of the most important potential mitigation measures for many of the above mentioned impacts associated with Alternative 1B.

- To reduce the amount of dust generated during construction activities, all dirt construction roadways should be maintained in a dampened condition; dirt-hauling vehicles should operate at low speeds or be covered; grading operations should be restricted on windy days during the summer and fall season; all exposed soil should be revegetated as quickly as possible.

- Construction should be scheduled during the dry season (April through October) in order to minimize the potential for erosion.

- If construction must continue during the rainy season, detailed erosion control contingency plans should be filed by the contractor in advance of construction activities and should include consideration of sedimentation basins, surface protection or runoff diversions as methods of erosion control.

- The exact route of the pipeline should be planned to minimize destruction of woodland areas.

- Construction within areas of riparian habitat should be avoided wherever possible.

- Effective noise reduction mufflers should be installed and maintained on all construction equipment with internal combustion engines.

- All construction activities within noise sensitive residential areas should be scheduled within normal working hours (8:00 AM to 5:00 PM).

- Coordinate pipeline and I-580 construction, avoid construction along I-580 during peak commute hours.

- A detailed geotechnical survey of the pipeline route should be conducted by a registered geologist or certified engineering geologist in order to identify and evaluate all potential geologic constraints.

- Recommendations/conclusions of the geotechnical report should be followed in determining the precise pipeline route and in constructing the pipeline.

- Where the pipeline must cross known active or potentially active faults, it should be designed to withstand expected fault displacements. Valves should be placed on either side of the fault trace.

- Replace the lost wastewater discharges to Arroyo de la Laguna and Alameda Creek with continued managed releases by Zone 7 from the South Bay Aqueduct and local reservoirs to maintain adequate summer flows in the streams and groundwater recharge basins. Expense for such an operation should not be borne by LAVWMA, but by the benefiting agency.

- The exact location of recorded archaeologic sites should be determined by a qualified archaeologist before final plans for the pipeline route have been determined. The results of the archaeologic survey should be utilized to avoid disrupting archaeologic sites.

- A person qualified to recognize historical archaeological resources must be present during all ground disturbance operations with the authority to stop construction and determine the significance of sites that may be uncovered and recommend the appropriate mitigation measures, which should be cleared through the State Historic Preservation Officer.

SECONDARY IMPACTS

Secondary impacts are the effects of projected urban development caused, encouraged, or, in this case, accommodated by the wastewater management project. The extent of such impacts in a given situation is therefore generally related to the design population and particularly to the form and location of such development. Since the design population of each alternative would be the same, the secondary impacts of each alternative would be the same. A complete listing of the secondary impacts of the project and potential mitigation measures is contained, for the sake of brevity, in the subsequent discussion of Alternatives Considered.

ALTERNATIVES CONSIDERED

PRESENTATION OF ALTERNATIVES

The Livermore-Amador Valley Water Management Agency initially considered 15 wastewater treatment and disposal alternatives. After screening by federal and state agencies, including the Environmental Protection Agency, the State Water Resources Control Board, and the Regional Water Quality Control Board, and after considering the public input generated by an October 15, 1974, public workshop, the list of alternatives was reduced to six viable alternatives.

The screening process evaluated the compatibility of each alternative with past planning efforts and the Bay Area Water Quality Control Plan (Basin Plan), and determined the cost-effective ability of each alternative to meet water quality goals and objectives, and waste discharge requirements. A more detailed technical analysis of the viable alternatives (based on engineering, economic, and implementability criteria) was then performed in order to initiate viable alternative screening.

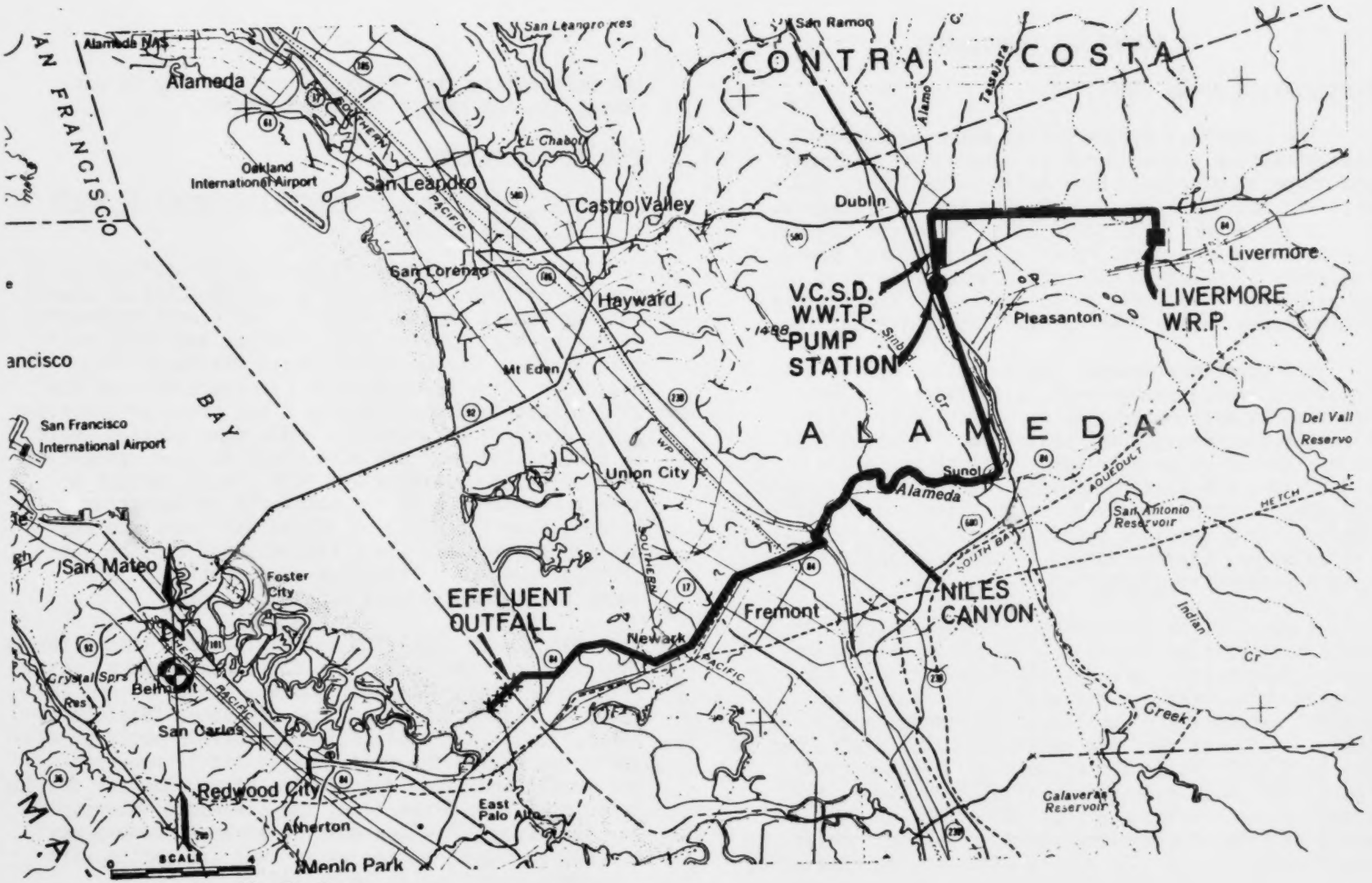
A description of the five viable projects and one subalternative follows. Those alternatives rejected in screening are described in the next subsection. The viable alternatives fall into four general categories of wastewater treatment and disposal: (1) treatment and receiving water discharge; (2) land application techniques; (3) treatment and reuse; and (4) a combination of alternatives. All alternatives propose continued treatment at the existing City of Livermore plant, consolidation of the Pleasanton and VCSD plants with service continuing at the VCSD plant, and alternative methods and locations of effluent disposal. This in no way precludes the possibility that Pleasanton may decide to construct its own sewage treatment plant.

Viable Alternatives

Alternative 1A - Treatment and Export to South San Francisco Bay

This alternative would involve the collection of treated effluent from the VCSD and the City of Livermore treatment plants, with its subsequent transportation by both gravity-flow pipeline and force main through Niles Canyon for ultimate discharge into south San Francisco Bay. The Livermore WRP and the VCSD plant would be linked by a new gravity-flow pipeline. Regulating reservoirs and a pump station would be constructed near the VCSD plant to pump wastewater from both the Livermore and VCSD plants through a transport pipeline to a point north of Dumbarton Bridge, near the midpoint of the San Francisco Bay navigation channel, where the effluent will be discharged. Figure 3 indicates the position of the above plan elements on a subregional map.

Along with receiving water disposal, this alternative includes the option for continued reuse of wastewater to irrigate the golf course, airports, and farm lands at Livermore, as well as any other feasible reuse option. Land application operations would be discontinued during the rainy season and if required monitoring indicated degradation of groundwater quality. Because of this precaution, the Livermore interceptor and the export pipeline must be sized to convey maximum design flows, in the event that irrigation with reclaimed water had to be halted.



Source: John Carollo Engineers

Figure 3. EXPORT TO SOUTH SAN FRANCISCO BAY - ALTERNATIVE 1A

Alternative 1B - Treatment and Export to East Bay Dischargers Interceptor

This alternative would continue the present level of treatment at the existing Livermore WRP and VCSD treatment plants, with ultimate discharge into the proposed EBD Interceptor. The alignment of the pipeline and the locations of the pumping stations and porposed outfall are also outlined in Figure 4. As in Alternative 1A, a new storage reservoir and pumping facility at the VCSD plant would accept flows from the VCSD plant and the Livermore plant (conveyed to the site through the same Livermore Interceptor pipeline). The new force main to the Bay would head west from the VCSD plant to the Oro Loma-Castro Valley pumping station of the EBD Interceptor. The EBD Interceptor would carry the flows to an outfall located at the north end of Oakland Airport. As in Alternative 1A, limited reuse of treated effluent will be allowed as long as groundwater quality degradation does not occur.

Alternative 1Ba - Treatment and Export with Discharge to San Lorenzo Creek

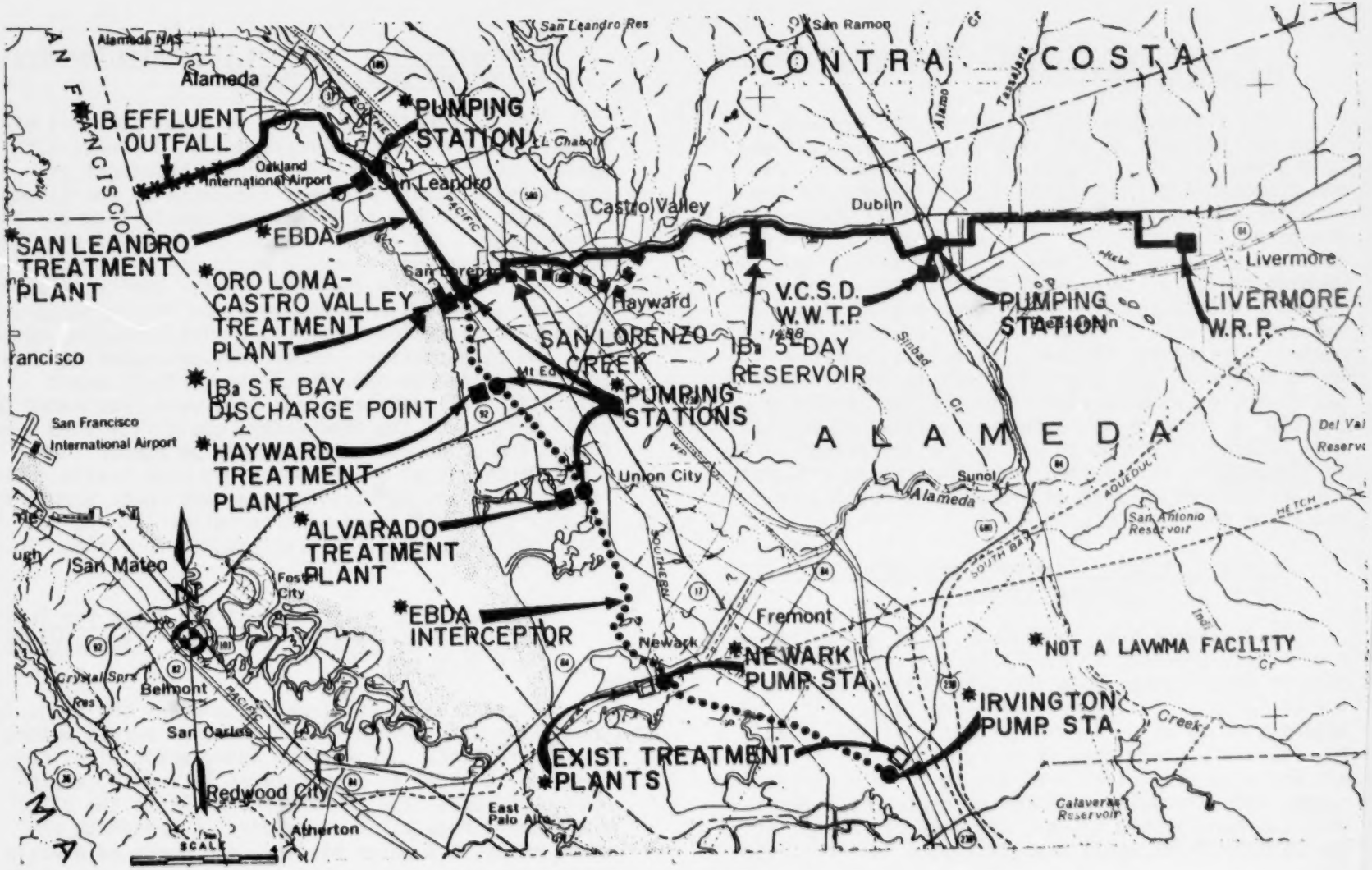
This alternative, considered to be a subalternative of 1B, proposes to discharge effluent into San Lorenzo Creek rather than into the EBD Interceptor. The elements of this alternative are identical to Alternative 1B up to Boehmer Summit as illustrated in Figure 4. A new regulating reservoir at the Summit would receive flows from the force main and discharge into a gravity pipeline connecting the reservoir and San Lorenzo Creek. Effluent discharge into San Lorenzo Creek would then flow into San Francisco Bay.

Alternative 1E - Treatment (Including Demineralization) and Local Discharge

This alternative proposes to treat combined effluent from both the Livermore and VCSD plants with denitrification and reverse osmosis treatment processes for ultimate effluent discharge in the Alameda Creek watershed and salt brine discharge into the EBD Interceptor. The same Livermore Interceptor pipeline as in Alternatives 1A and 1B would convey the Livermore WRP effluent to the VCSD plant. Denitrification and reverse osmosis demineralization unit processes would be constructed there along with a holding reservoir and pump station. Other unit processes may have to precede reverse osmosis, although their exact nature is still undetermined. Effluent, estimated to be 75 percent of the feed water, would flow into Alamo Canal. The brine concentrate would be pumped to the EBD Interceptor at the proposed Oro Loma-Castro Valley pumping station, maintaining the same route across the mountains as that found in Alternative 1B. The geographical features of this alternative are shown in Figure 5.

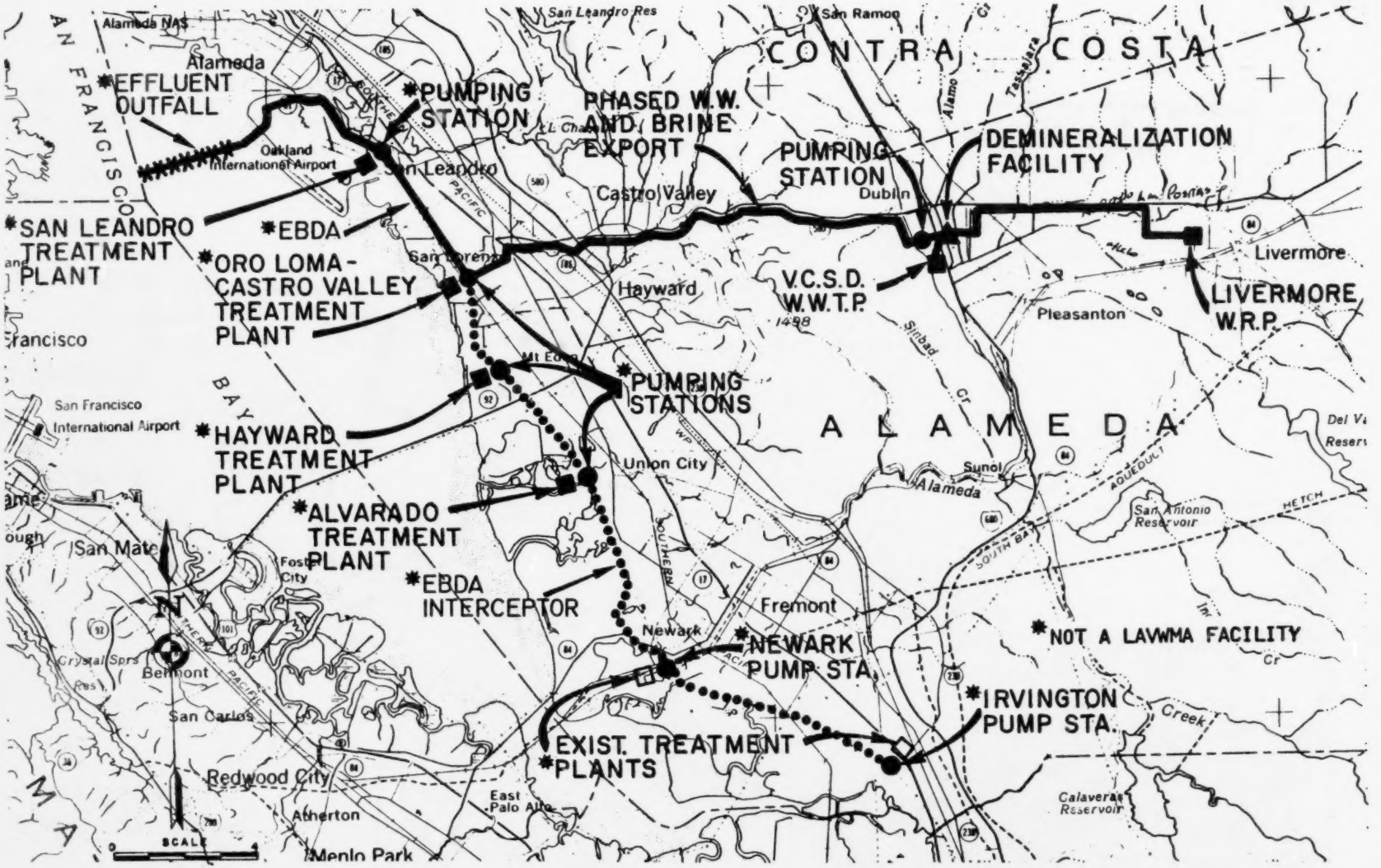
Alternative 3A - Impoundment and Reuse for Irrigation with Wet-Weather Release of Excess Water (Salt Routing)

Alternative 3A combines impoundment and reuse for irrigation with wet-weather release of excess water, or salt routing. A Livermore Interceptor pipeline identical to that in Alternatives 1A and 1B, would convey effluent from the Livermore WRP to the VCSD plant where regulating reservoirs, a phosphate removal plant, a pumping station, and force main would store, process, and transport the waste to the storage reservoir site in Sinbad Canyon, as indicated in Figure 6.



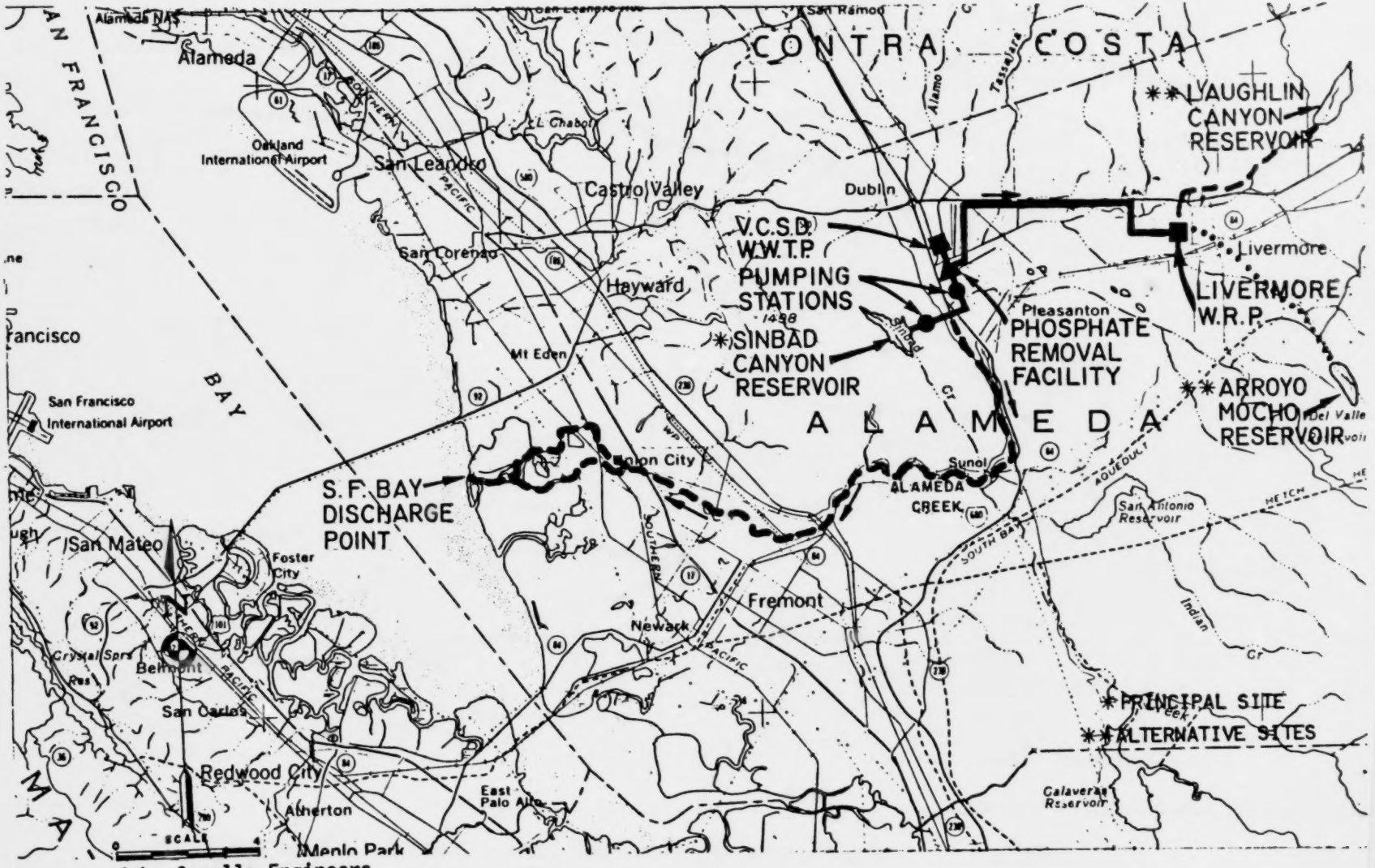
Source: John Carollo Engineers

Figure 4. EXPORT TO EAST BAY INTERCEPTOR - ALTERNATIVE 1B, & EXPORT TO SAN LORENZO CREEK - ALTERNATIVE 1Ba.



Source: John Carollo Engineers

Figure 5. TREATMENT, DEMINERALIZATION AND LOCAL DISCHARGE - ALTERNATIVE 1E, & INITIAL EXPORT WITH FUTURE DEMINERALIZATION - ALTERNATIVE 4A.



Source: John Carollo Engineers

Figure 6. SALT ROUTING - ALTERNATIVE 3A.

The force main would be laid south along I-680 constructed from the VCSD pump station to a point near Bernal Avenue, where the pipeline would head in a southwesterly direction across the Arroyo de la Laguna to Pleasanton Ridge. A tunnel would be constructed through Pleasanton Ridge to the reservoir site in Sinbad Canyon. As in Alternatives 1A and 1B, effluent from the Livermore plant and water in the reservoir would be available for irrigation, although groundwater quality would be monitored and irrigation halted if degradation occurred. Water in the reservoir would also be available for restricted (non-body-contact) recreational uses.

During the winter months, a system of managed wet-weather releases from the reservoir would be coordinated with other concerned water management agencies. Winter releases would allow high-TDS wastewater to commingle with large winter runoff for dilution and minimum percolation in saturated soils. The geological structure of the Sinbad Canyon reservoir site is such that groundwater infiltration would be minimized. Release of water to Arroyo de la Laguna would occur at an outlet station at the east end of the aforementioned tunnel.

Two other potential reservoir sites, one in Laughlin Canyon and the other in Arroyo Mocho, are also being considered. Sinbad Canyon is the most cost-effective reservoir site.

Alternative 4A - Initial Export with Future Demineralization for Wastewater Reclamation and Reuse

This alternative, a phased combination of Alternatives 1B and 1E, was developed in order to minimize monetary costs and environmental degradation in the shortrun and maximize use of improving technology and reclamation opportunities in the long run. Initially (until 1987), the project would be a small-scale Alternative 1B (export to the EBD Interceptor). Near the midpoint of the design life, demineralization facilities would be added, and the export force main would then convey brine concentrate and unreclaimed wastewater, estimated to be 25 percent of the feed water, to the Bay. Demineralized water would then be discharged to the Alameda Creek tributary system for groundwater recharge. The location of the project's facilities are the same as in Alternative 1E and consequently are shown in Figure 5.

Evaluation of Alternative Actions

All of the alternatives, analyses of impacts, and engineering analyses have been based on the premise that construction of the facilities would begin immediately. Conditions external to the LAVWMA Wastewater Management Study suggest that other implementation schedules would have merit. There may be considerable advantage to delaying implementation or phasing a project.

Delayed Project

Delaying the project for some reasonable period may allow explicit consideration of Las Positas and the VCSD plant expansion. The period necessary to receive explicit input on those decisions may be too lengthy in terms of water quality degradation in the Valley and Niles Cone. Delaying implementation of the project would allow an opportunity to gather data from the current groundwater monitoring program. A reasonable period of delay could be anticipated as the monitoring program is underway and final results would not necessarily have to be available in order to draw some preliminary conclusions that would aid

the LAVWMA project facilities design. There would, of course, be disadvantages to delaying implementation of the project. Primarily, waste discharge requirements would not be met on schedule, although the initial compliance date of the State Water Resources Control Board Order No. 71-3 has already passed. The delay period would, however, be a definite period and thus may be acceptable to the parties concerned. In the interim, though, there is a danger of continued, and perhaps critical, degradation of Valley groundwaters and Niles Cone recharge waters. In the event a decision is made to delay the project, the critical nature of groundwater degradation should be examined. It may be that the situation is not so urgent that a relative advantage could be gained in having further information with which to design and implement the LAVWMA project. Inflated construction costs would be another major factor to consider as it also would be with a phased project.

Phased Project

A phased project would consider the building of limited facilities now and additional facilities later, or it could consider the building of the entire project now but later modifying its use through a different technology. Thus, it would be possible to build a project now with sufficient capacity for 10 years hence and expandability to accommodate the 10 years' growth increment following. The primary advantage of a phased project over that of a delayed project is that discharge requirements to Alameda Creek would be met immediately. The 10-year period would most certainly allow explicit consideration of Las Positas and VCSD at the time of second phase implementation. This opportunity for a second consideration of system design capacity would minimize the risk involved of assessing and projecting the future growth with regard to other matters also. Another advantage of a phased project is that initial monetary costs would be minimized. This may be a very important consideration in light of the limited funds for wastewater management and the abundance of high-priority needs. It would also have some significance for local funding as the future growth could be more easily assessed to pay for the future expanded portions. Another advantage of the phased project in allowing a long-term second look at design of the facilities would be the opportunity to utilize improved technology. It is very likely that present state-of-the-art treatment technologies will be vastly improved in 10 years. The disadvantages of a phased project appear to be few and are in terms of risk rather than real identifiable conditions. There is also some risk that rising construction costs and rising interest rates would increase the relative cost of the project over that of building the entire project now. Whether the rising construction costs would be purely inflationary or whether they would be a real rise relative to other sectors of the economy is another question to consider. There is also some risk in the availability of federal and state funds unless they are committed now. The financing of federal programs may not have the same emphasis in 10 years or at whatever interval the second phase would be implemented, and thus the local communities would be forced to finance the remainder of the system with local funds. This risk could be minimized by an agreement at this time between the LAVWMA Board and federal and state officials to commit certain funds for the second phase of construction in exchange for a system of limited capacity at this time.

Rejected Alternatives

The rejected alternatives, of those 15 initially screened, are described as well as the reasons for their rejection. These reasons generally are excessive costs, failure to meet waste discharge requirements, and failure to comply with the California State Department of Health policy to prevent groundwater contamination by stable organic compounds.

Alternative 1C - Treatment and Export to the Pacific Ocean

This alternative is similar to Alternative 1A except that wastewater would be piped past south San Francisco Bay over the Santa Cruz Mountains, and then discharged through an outfall into the Pacific Ocean. Although discharge requirements and water quality objectives can be met, and the Pacific Ocean offers greater dilution and dispersion capabilities than the Bay, the extra cost of this proposal over that of Alternative 1A eliminated it from further considerations.

Alternative 1D - Treatment and Export to the San Joaquin Valley

Conveyance of treated wastewater from the Livermore and VCSD plants east over Altamont Pass to the San Joaquin Valley, as proposed by this alternative, was rejected by other planning studies and by this study also. Because the San Joaquin Valley already has a severe salt balance problem, the addition of high TDS wastewater from the Livermore-Amador Valley would only exacerbate the problem. Another consideration was the possibility that certain constituents in the wastewater, primarily nitrates, would eventually reach the San Joaquin-Sacramento Delta System, which is more sensitive to nutrient input than the Bay.

Alternative 1F - Treatment (Including Demineralization of Water Supply) and Local Discharge

Demineralization of the Livermore-Amador Valley water supply and conventional secondary treatment followed by effluent filtration would constitute the elements of this alternative. Valley homeowners would benefit from a reduction in water supply system damage and water-softening costs. However, the alternative would fail to meet waste discharge requirements.

Alternative 1G - Treatment of Wastewater and Dilution with Imported Water in Existing Streams

This alternative would try to achieve Alameda Creek water quality objectives of 250 mg/ℓ TDS by diluting VCSD and Livermore effluents with water from the Zone 7 share of SBA import water. However, Alameda Creek objectives or RWQCB TDS mass emission rate limitations are impossible to meet with this scheme. Because of the economic and physical impossibility of meeting these objectives and requirements, this alternative was rejected. Environmentally, the alternative is unfavorable because it would not safeguard groundwater from stable organic compounds potentially adverse to public health. Large quantities of import water would also present environmental limitations at the source of supply.

Alternative 2A - Treatment and Land Disposal by Spray Irrigation

This alternative proposes continued operation of the VCSD and Livermore treatment plants with effluent disposal accomplished solely by spray irrigation. Discharge quality would have to equal or surpass EPA's secondary treatment definition and State of California Department of Health requirements. Although this disposal alternative was agreeable to the SWRCB, RWQCB, and EPA and is quite economical, the large land area required and the inherent danger of groundwater contamination made it nonviable. As mentioned previously, though, well-monitored land disposal operations for part of the flow were included in the viable alternatives.

Alternative 2B - Deep-Well Disposal

This alternative is characterized by removal of suspended solids and biologically active compounds, which cause plugging of injection wells and surrounding aquifers, and subsequent deep-well disposal would have to be determined before a reasoned judgment on this alternative could be made. This alternative was rejected due to the cost of such an exploration and a determination by the California State Department of Health that such disposal practices may pollute usable groundwater supplies.

Alternative 3C - Complete Treatment and Reuse for Augmentation of Water Supply

Complete secondary treatment, followed by nitrogen, phosphorus, and TDS removal disinfection, and reuse for water supply, are the elements of this project. The State of California Department of Health recommends against this alternative because even this relatively extensive treatment scheme does not necessarily eliminate residual virus and trace organics.

Alternative 4B - Initial Dilution with Future Demineralization of Water Supply and Wastewater

The first phase of the project would consist of continued treatment at the VCSD and Livermore plants with disposal in the Alameda Creek tributary system aided by SBA dilution water addition to meet waste discharge requirements. In the second stage, wastewater demineralization would be achieved by water supply demineralization. This alternative was rejected due to its inability to meet salt mass emission rate limitations, and the expense and questionable nature of water supply demineralization. Neither does it meet Health Department policy objectives.

No Action Alternative

This alternative would allow the problem of Niles Cone groundwater degradation to persist and increase in magnitude in direct relation to population growth. The "No Action" alternative does not conform with past planning efforts and would not meet water quality objectives or waste discharge requirements. The advantage of "No Action" would lie in its ability to halt growth in the service area, and to stabilize deteriorating air quality. However, such a scenario could also be achieved with any of the alternatives by limiting their capacity to present needs. In this way, water quality problems would be eliminated and the already hazardous air quality situation would not be exacerbated. The "No Action" alternative was therefore rejected from further consideration.

ENVIRONMENTAL EVALUATION

PRIMARY IMPACTS OF OTHER VIABLE ALTERNATIVES

Alternatives 1Ba, 1E, and 4A

Since Alternatives 1E and 4A would require the same pipeline route as the selected project, the construction impacts would be nearly identical to the selected project. Alternative 1Ba differs from the selected project only in the western segment of the pipeline. Instead of transporting the effluent to the EBD Interceptor in San Lorenzo, Alternative 1Ba would discharge effluent into San Lorenzo Creek.

Alternative 1Ba would require less construction materials, thus it would generate less jobs and personal income, and the impacts of noise, dust, and traffic disruption in residential areas of Castro Valley and San Lorenzo would be avoided. However, since some of the flow in San Lorenzo Creek recharges local groundwater basins, the discharge of effluent would have the potential of adversely affecting groundwater quality, particularly with regard to nitrates and trace organics.

Construction of the pipeline for Alternatives 1E or 4A would consume less construction materials since a smaller diameter pipe is required to transport salt brine from the demineralization process. These alternatives would ultimately have beneficial impacts on both groundwater and surface water in all affected areas. Local surface discharge would have the beneficial impact of insuring year-round flows in Alameda Creek and as the volume of discharge increases with the population, the fishery in Alameda would continue to improve. The expected 75-percent reduction in TDS levels would allow the effluent to meet the waste discharge requirements and water quality objectives of Alameda Creek. In addition, a substantial reduction in chlorides, nitrates, and residual organic concentrations would occur. However, the problem of trace organics would not be entirely eliminated and for this reason the State Department of Health will probably recommend against these alternatives.

Niles Canyon-South Bay Pipeline (Alternative 1A)

The construction of a pipeline from the VCSD treatment plant south along Arroyo de la Laguna, then west through Niles Canyon and across the urbanized bay plain to an outfall just north of Dumbarton Bridge would have more serious environmental impacts than the selected project. A much greater amount of riparian and foothill woodland habitat would be lost than with Alternative 1B. The potential for increased siltation in Alameda Creek is much greater since construction would occur within and along the channel of Arroyo de la Laguna and Alameda Creek.

Impacts on traffic would be more severe to users of Niles Canyon Road, but a lesser volume of traffic would be affected. Disturbance of residents by construction activities (noise and dust) would be similar in magnitude to the 1B pipeline. However, while most of the Dublin Canyon pipeline is located within grassland habitat, the Niles Canyon pipeline would be located primarily within the more valuable foothill woodland and riparian habitats. Potential geologic hazards/constraints would be similar to the 1B pipeline. The 1A pipeline must also cross the active Hayward and Calaveras faults and thus would also be subject to damage or rupture with resulting loss of service should sufficient displacement occur along either of these faults. The western end of the pipeline would cross a salt marsh which is a particularly

sensitive and restricted wildlife habitat in the Bay Area.

The amount of energy required to construct the Niles Canyon pipeline would be greater than the Dublin Canyon pipeline because of the greater length, but the amount of energy required to operate the pipeline would be significantly less than Alternative 1B since the pipeline is downgrade throughout most of its length. Because of the greater length of pipeline, the amount of employment and personal income generated by Alternative 1A would be approximately 70 percent greater than the selected project.

The operation of Alternative 1A would have the same effects on surface flows in Arroyo de la Laguna and Alameda Creek and thus would have the same effects on fish, wildlife, vegetation, groundwater recharge, and water quality as the selected project.

Alternative 3A

The construction of an effluent storage reservoir would be subject to strong groundshaking during a major earthquake and might lead to possible dam failure and downstream flooding. Increased sediment loads would be added to downstream channels during site preparation while release of effluent could increase streambed erosion, particularly in Arroyo La Positas below the proposed Laughlin Road reservoir site. The construction of an earthen dam and reservoir would likely result in more dust generation than any of the viable alternatives. However, since the proposed sites are in unpopulated areas, the impact would be restricted primarily to local vegetation and wildlife. Throughout most of the year, operational impacts associated with this alternative would be identical in many respects to the selected project. However, the major traffic impacts associated with the other effluent export alternatives would be avoided.

The placement of a dam and reservoir in Sinbad Canyon would eliminate one of the best developed foothill woodlands in the East Bay region. The selection of the Laughlin Road reservoir site would result primarily in the loss of grassland vegetation, while construction at the Arroyo Mocho site would result in the loss of some specimens and a reduction in the range of a rare plant species.

Significant adverse impacts to wildlife would result from the clearing of woodland habitat at the Sinbad site.

SECONDARY IMPACTS

A principal effect of the proposed project is the inclusion of additional population growth and development in the form of capacity in excess of present needs. The secondary or indirect impacts of the project on the Valley environment are the effects of the form and location of this development. While the proposed project will not cause such development, it will accommodate it. In order to determine the nature and significance of these effects, we have sought to determine the dynamics and assumptions through which the development would be implemented, and, most importantly, its form and location.

The Valley has rapidly grown from a rural agricultural area to a bedroom community of significant population. Growth that has occurred since the mid-1950s has been stimulated by San Francisco Bay Area decentralization and suburbanization. It was attracted to the Valley by improved highway access to central Bay Area jobs. New housing in the Valley began to outpace local job opportunities about 1963 and surpassed jobs about 1967. The majority of newer residents are employed outside the Valley. Low land values and good housing values have also stimulated Valley growth.

Prospects for continued growth will turn on the same phenomena of regional growth and decentralization with good employment access and good housing values. Available land and local plans are expected to accommodate at least a population of 190,000 by the year 2000, and perhaps a population as high as 237,500. There are, however, some serious constraints and impacts which must be recognized for a Valley population of those magnitudes.

Valley development is not constrained now or will not be in the near future by water supply, transportation capacity, available land or municipal services. Sewage capacity is currently a strong constraint on Valley growth. School capacity and local employment are limited but are not seen as a serious constraint.

The major secondary impacts of projected development would be serious degradation of already poor air quality, consumptive use of land, and subsequent loss of environmentally sensitive areas.

Air Quality

The Livermore-Amador Valley has some of the worst air quality in the San Francisco Bay Area due to the meteorology and topography of the area, along with an abundance of air pollution sources. There are three major sources of air pollution in the Valley; mobile sources (primarily motor vehicles), stationary sources, and transported pollutants from the west. The major pollutant in the Valley is photochemical oxidants for which a National Ambient Air Quality Standard has been promulgated to protect the public health. This standard was exceeded on 93 separate days in 1974, when Valley population was about 110,000, creating significant health hazards and damaging agricultural crops and materials in the Valley.

The air quality of the Valley should improve noticeably within the next 15 years due to improved stationary and mobile source controls. Air quality should worsen again after 1990 as further growth, and the increased sources associated with it, overcome the benefit of improved emission controls. Although air quality will probably improve in the near term, the improvement will still leave the air quality in the

Valley far short of meeting the National Ambient Air Quality Standards. For Valley populations of 157,000 and 190,000 in the year 2000, the number of days standards would be exceeded is 9 to 17, and 15 to 27 days respectively.

Stationary sources within and outside the Valley will be controlled to their maximum extent. Mobile sources will also be controlled to their maximum extent within 10 to 15 years, barring no further technological advances other than those already required by law. The only means at present to mitigate air pollutant sources is to reduce emissions through a program of reduced automobile usage and reduced vehicle miles traveled (VMT). Due to the poor air quality situation in the Valley at present and in the future as defined by exceeding the national oxidant standard, any increase in VMT over present levels is inconsistent with the goal of achieving clean, healthy air.

Figure 7 illustrates the relationship between various future population levels and the number of days on which National Ambient Air Quality Standards (NAAQS) will be exceeded. It shows that the population level required to meet air standards is approximately half the present level of 1975. It shows that even a policy to maintain present levels of population cannot meet air quality standards and that higher levels of population will cause even more adverse days on which standards will be exceeded. The range of days expresses for each year and population level what would occur for an average versus a poor air quality year. It should be noted that air quality standards are to be met even in the worst years. Clearly any population increase would further degrade air quality, therefore it should be recognized that population increases are also inconsistent with the goal of achieving clean, healthy air.

Consumptive Use of Land

The Valley communities are presently low-density and exhibit rapidly growing populations. Many environmental problems are related to this land use pattern, generally. However, some Valley communities are looking toward measures to remedy these problems.

- Loss of agricultural lands
- Loss of open space
- Loss of vitality in city centers as population and new economic activity moves out
- Dislocation of housing, job centers, and shopping resulting in excessive auto travel demands and
- Reduced public transit feasibility.

Loss of Environmentally Sensitive Areas

Excessive land consumption for low density residential development leads to loss of areas with intrinsic natural, aesthetic, historic, and sometimes economic value. Much of the Valley's prime agricultural soil has already been covered by development.

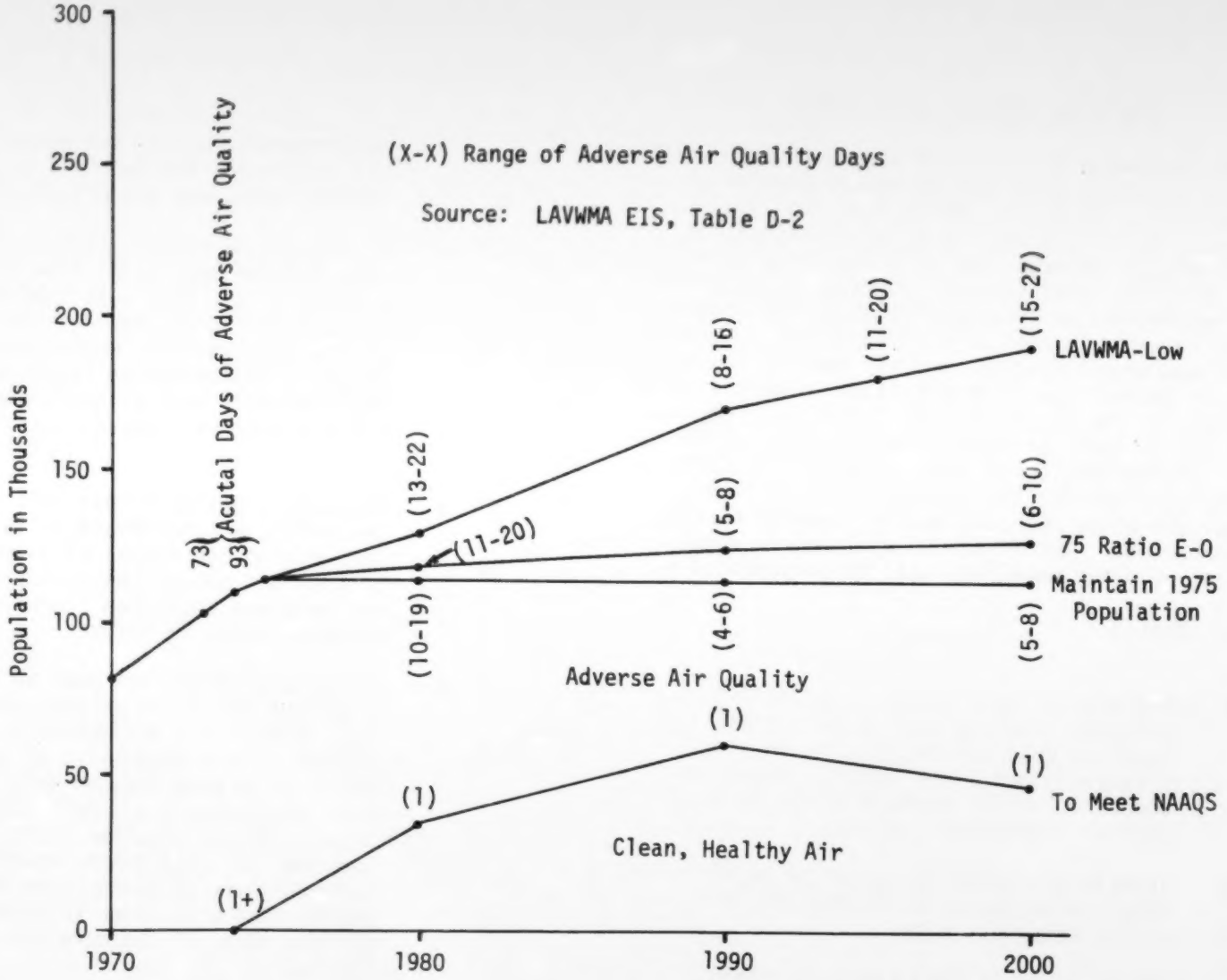


Figure 7. ESTIMATED FUTURE AIR QUALITY OF THE LIVERMORE AMADOR VALLEY

POTENTIAL MITIGATION MEASURES

The following is a list of potential mitigation measures for the primary and secondary impacts of the alternative projects. While NEPA and CEQA require development and consideration of mitigation for all project impacts, EPA will only require mitigation of those impacts which contravene Federal laws, regulations or Presidential executive orders. In this project, impacts on archaeological resources, rare or endangered species, and air quality are required by Federal law to be mitigated. Agencies with the authority and responsibility for mitigation may select any of these or other equally effective measures. Implementation of other potential measures is therefore left for the consideration of local, regional and State agencies as they deem necessary and appropriate. The final EIS will report which of these, or other measures, will be implemented.

PRIMARY IMPACTS

- Preserve as open space, areas of high botanical quality such as salt marsh, foothill woodland (especially on Pleasanton and Sunol Ridges), riparian woodland, native grassland, and sites of rare or endangered species.

- Impacts on vegetation would be least severe with the Laughlin Road alternative reservoir site.

- If one of the wooded sites is chosen, timber should be salvaged as a conservation measure. This is only a conservatory measure and would in no way compensate for the loss of the foothill woodland and grassland.

- If one of the wooded sites is chosen, clearing the vegetation from that portion of the reservoir that would be permanently inundated is preferable to the problems that would result from decaying vegetation in later years if the reservoir were to be flooded without first being cleared.

- Relocate pipeline across salt marsh and salt ponds northward (Alternative 1A), out of the ranges of endangered species and out of the boundary of the proposed South San Francisco Bay National Wildlife Refuge.

- If salt marsh habitat must be disturbed, establish new marsh as replacement habitat. Schedule construction to avoid the nesting season especially of the endangered California Clapper Rail and the rare California Black Rail (April to July). If the pipeline route that follows the railroad tracks south of Dumbarton Bridge is chosen, the embankment should remain in order to retain the nesting sites of the rare and endangered species.

- Selection of Alternative 1E or 4A would retain surface flows in Alameda

Creek during low flow season thus insuring the continuance of a fishery there.

- Avoid using heavy construction equipment in the marsh and permit access to a very limited area.

- Avoid dumping excavated earth on valuable marsh habitat and replace earth above the pipe when completed. Burlap mats can be used to collect the excavated earth. Incorporate the marsh into the national wildlife refuge. When final alternative is chosen a detailed survey of sensitive wildlife habitats should be conducted.

Where system failure might endanger peoples' lives, health, or property, all practical design, engineering, and construction techniques should be utilized in order to guarantee the required safety. Such failure of the system lines and/or reservoirs could result from earthquakes or other natural and man-made disasters.

Homes and other properties located below a reservoir, if such is constructed, might have to be covered with special insurance/liability arrangements.

The most significant operation impact is produced by recreational traffic to the reservoir sites of Alternative 3A. Traffic reduction could be accomplished by special busing, but this would be impractical without having a local transit system for the Valley.

The primary impact on recreation would be the possible addition of a recreational reservoir. Mitigation measures for this and other impacts are as follows:

- If Alternative 3A is chosen, then the reservoir site furthest from existing and proposed reservoirs should be chosen. This would have the least effect on the quantity of users at other sites, and provide close recreation to the highest number of new users.

- If the reservoir is built, the local Park District should develop unique recreation programs that are unlike existing programs at other reservoirs, allowing the reservoir to provide a unique recreational experience.

SECONDARY IMPACTS

Geology/Soils

- Construction of residential, commercial, and public buildings within 50 feet of a potentially active fault trace should be prohibited.
- To prevent potential slope stability problems, development of critical hillside areas should be prohibited. Often, adequate engineering design and construction is not economically feasible.
- Detailed erosion contingency plans should be filed for developments in which grading activities could continue into the rainy season.
- Class I and II soils should be preserved for agricultural uses wherever possible.

History/Archaeology

- In order to plan for growth in such a way as to minimize the potential impact on historical/archaeologic resources, the future LAVWMA Service Area should be surveyed by qualified archaeologists.
- Provisions should be included in local regulations to ensure that grading operations in undisturbed areas will not destroy or disrupt archaeologic or historic resources.
- To avoid possible vandalism or destruction of known archaeological sites, the exact location of these sites should not be made public.

Recreation

- Increase funding to local parks and recreation agencies to ensure the continuation of urban park land to meet increased demand.
- Protect areas planned for future park development from encroaching urban development. Such areas may be protected by outright public purchase or zoning requirements for dedication of land by developers.

Aesthetics

- Preserve large amounts of open space near urban centers and on the Valley's uplands in order to maintain the natural setting of the Valley.

Land Consumption

The following mitigation measures are directed toward the pattern of development and the impact on consumption of undeveloped lands. These types of impacts and mitigation measures may be similar to those identified in the next part as required to produce more compact urban centers in order to reduce travel, related emissions, and preserve air quality.

- Protect lands which have intrinsic values, other than ease of developability or which are inherently hazardous to development, including those with slopes over 30 percent, those subject to landslides, those important as watersheds, and prime agricultural lands.

- Establish residential land-use patterns which not only use less land per residence, but also require less land for systems. This type of development provides for the needs of smaller families and households also.

- Protect open space near urban fringes to preserve the individuality and identity of each city.

Vehicular Travel and Air Quality

As National Ambient Air Quality Standards are not being met at present and the future does not promise that they will be, it is EPA's concern that the project proposed for Federal support not involve an increase in vehicular travel or resulting emissions.

It is the purpose of this section then to specify potential mitigation measures which LAVWMA or other agencies could find applicable and acceptable to implement.

Transportation-Related Measures. Measures directed at modifications in the existing or planned transportation system can be considered in two groups, one as the enhancement of the role of transit within transportation and the other as utilizing the capacity of the existing automobile system more efficiently.

All of these measures assume the existence of continuance of some bus service. The more direct means for enhancing transit is to improve the mobility of buses within existing traffic streams. Reserved rights-of-way for bus operations are the most common, including:

- Exclusive transit lanes in the median of a high capacity corridor.

- Reserved lanes on the low volume side of the freeway, otherwise known as contraflow lanes.

- Transit vehicle priority at signalized intersections.

Of these measures, the exclusive transit lanes are scheduled for implementation on Interstate 580 as it is widened through Dublin Canyon. They will not be fixed rights-of-way, but will be reserved for buses and car pool vehicles during the weekdays.

Several measures may be implemented which improve the image or transit rider's perception of the transit system. This could include:

- Parking lots which allow the automobile driver to leave his auto at the transit station after a short local drive. However, such short trips are the worst kind in terms of the cold start/hot soak cycle of engine utilization.

- Bus passenger shelters at bus stops.
- Off-line or off-street stops for buses.
- Improved transit connections with coordinated scheduling or routing for buses.

Of these means, it appears that the park and ride facilities and the bus shelters hold the most promise for implementation by LAVWMA or appropriate agencies.

Assurance by LAVWMA jurisdictions that sufficient parking space exists near the BART feeder bus stops would be an incentive or would at least eliminate a disincentive to those who desire to utilize the BART feeders but have no other means of access to feeder lines. Provision of bus shelters would assure the riders that they could utilize the system in inclement weather conditions. Some potential may exist in the coordinated scheduling and routing of buses, especially as local service could be implemented within the Valley centers.

Special operating forms of bus transit may also have some applicability within the Valley. One in particular would have applicability to intra-valley work trips, the commute work trip out of the Valley, and perhaps some recreation trips within the Valley. This is subscription service, which is similar to chartered bus service but on a regular daily basis.

A rather general class of transit measures which has come to be known as para-transit may have some applicability within the Valley. One of the specific systems is Dial-A-Ride, or Dial-A-Bus as it is known by several names in the industry. It is currently being recommended by DAVE Systems to the City of Livermore as a potential local bus system.

Regional transit would most likely come to the Valley in the form of the BART extension currently under study.* Another potential for rail transit exists within the Valley on the existing Western Pacific and Southern Pacific tracks. A proposal has been made in recent years to establish trolley car service on the little used tracks within the San Ramon Valley and to establish a system for utilizing tracks within the Livermore-Amador Valley.** Such a service would establish a feeder line to the BART system in Walnut Creek and would serve much of the intra-Valley traffic between centers.

The other group of transportation system modifications is directed toward the automobile and more efficient use of existing highway capacity. In addition, some measures are directed toward disincentives for automobile use.

Car pooling is one of the most well known means with the greatest potential for more efficient use of existing investment and existing capacity in transportation. A related source is van pooling in which employers or employee groups may purchase 9- to 11-passenger vans and employ them as in car pooling. Several other measures may be employed to make car pooling or van pooling more attractive.

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* Livermore-Pleasanton BART Extension Study, Final Alternatives, January 25, 1974.

** Mr. Patrick Whittle, Danville, California

- Toll reductions for car pools such as now occur on the San Francisco-Oakland Bay Bridge, and will occur on the new Dumbarton Bridge.

- Exclusive lanes for high occupancy vehicles, as will be employed on I-580 when it is completed through Dublin Canyon and continuing to the Bay Bridge.

- A travel time advantage may be given to car pools, as well as buses, in freeway ramp metering where a dual lane on-ramp is utilized and high occupancy vehicles are granted priority over single occupancy vehicles by the metering system.

- Reserved, close-in parking at major shopping and employment centers.

- Lower parking rates.

The above measures appear to have the greatest potential of any proposed. They are directly applicable to a large segment of Valley travel, relatively inexpensive to implement, and have been tried with some measure of success. The "RIDES" program was terminated simply for lack of funding.*

Two measures intended to discourage the use of the automobile or inhibit automobile dependency can be identified which may be implemented by local jurisdictions. Both of them tend to limit the circulation of automobiles or the accessibility of automobiles to limited areas. Automobile-restricted zones have been established in some cities where the central business districts have become excessively congested. These means could be available to the local centers in the Livermore-Amador Valley on a limited basis as pedestrian malls rather than for a large zone. The cities and counties may examine the feasibility of a pedestrian mall which would prohibit vehicles on the main street, encouraging vehicles to be parked and persons to walk while downtown. Although the potential for reducing vehicle miles of travel is limited, the advantage of this measure lies chiefly in reducing the automobile dependency habit and illustrating that other means of travel are available. A similar measure to be considered is to erect local street barriers which discourage through traffic in residential neighborhoods. This is a low-capital means which may be easily implemented with local neighborhood cooperation, as has been done in Palo Alto and Berkeley.

Another class of vehicle reduction means revolves around the bicycle and the provision of bicycle lanes. This has strong merit as there are already existing bicycle lane programs within the Valley centers and it generally tends to be low-capital in nature. A specific means which LAVWMA may adopt or seek to have adopted would thus be the enhancement of the existing systems.

Another means which holds promise for local implementation is provision of pedestrian paths as a second circulation network within the urban fabric. The impact on reduction of vehicle travel would be minimal, but again this measure has the added advantage of decreasing auto dependency. Such means could be implemented through zoning codes and subdivision map

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* Metropolitan Transportation Commission, Mr. Burt Crowell, April 1975.

approvals which would require dedication of lands through private development. A close ally in this effort would be various homeowners' and neighborhood associations throughout the Valley centers as this scale of travel is at a very local level.

Land-Use-Related Measures. Appropriate patterns of land use and urban form can reduce vehicle travel in several ways:

- Reduce need for trips.
- Reduce trip length.
- Enhance the feasibility and viability of transit systems.

Travel demand or the need to make trips may be reduced by encouraging those land-use sectors missing within the scheme to develop and balance the existing land use. The Livermore-Amador Valley employment characteristics are particularly illustrative of the problem of unbalanced land uses. Means to balance land uses would include:

- Allocation of sewage capacity to appropriate land uses.
- Encouragement of commerce and industry which employs local residents.
- Relocation of industries which employ in-commuters.

Reduction of trip length is another means of reducing vehicle miles traveled and can generally be accomplished by more compact development achievable through:

- Higher density zoning.
- Maintenance and redevelopment of city centers.
- Rezoning for cluster development.

Higher densities may be achieved by the in-filling of existing centers which enhances the viability of transit systems by increasing the density of trip demands. Some means to encourage in-filling of existing centers are:

- Limit the spread or expansion of existing centers to fringe lands.
- Alter tax assessment practice to protect open space values such as agricultural lands.
- Down-zoning of fringe lands is another means, but may be contested.
- Utilize Section 66474 of the Subdivision Map Act which states (in part) that "A legislative body of a city or county shall deny approval of a final or tentative map if it makes any of the following findings:

  "(e) That the design of the subdivision or the proposed improvements are likely to cause substantial environmental damage or substantially and avoidably injure fish or wildlife or their habitat.

(f) That the design of the subdivision or the type of improvements is likely to cause serious public health problems."

It is clear that, without implementation of a significant amount of mitigation, health of Valley residents will continue to be adversely affected by the air pollution associated with <u>any</u> additional population growth.

- Restrict the extension of utilities such as sewage interceptors.
- Federal and State policy in the financing of homes may also be utilized by giving advantages to homes closer to centers or new homes which are in-filling existing centers.
- Marginal cost pricing of utilities would be similar in effect to the restriction of their extension outside of existing centers.
- Establish a policy to disapprove rezonings and subdivisions outside of existing urban centers and incorporated boundaries.

Transit may also become a means as well as the incentive or object to make development more compact. The restriction of development to proximity of existing and planned transporation corridors as well as the requirement that all new development provide easy transit access would accomplish some more rational development patterns.

Open space is another land-use element which may be used to control the sprawl of growth including:

- Green-belts around established centers.
- Purchase of open space or scenic easements. This may, in some cases, involve the purchase of development rights from persons who had established the legal right to develop fringe lands.
- Purchase of development rights.
- Hazard zoning for floods and geologic hazards should also be employed where it would be of advantage to preserve open space.

More compact communities have been proposed as a means to accommodate growth and reduce VMT. Analysis shows that the location of the growth centers and the geographic distribution of travel must also be considered.

<u>Limiting Population Growth</u>. Limiting the extent of development or the size of populations is another means of reducing vehicle miles of travel since travel is directly related to the number of households or economic units within an area. Building moratoriums are one of the ways to limit growth but they must be established on more specific grounds:

- Relate air quality standard achievement to further land development approvals.
- Adopt an air quality element within local general plans. Such air quality elements

may establish the constitutionality of the related measure.

- Indirect Sources Review (ISR) such as the program which has recently been terminated by the Environmental Protection Agency. Such a program may prove to be more feasible at the local level where it can be more easily tied to local plans.

- Limit federal home loans and other housing programs within critical air basins. Such a limitation may have legal precedent with the National Flood Insurance Act and the relation of FHA loans to the Act.

A second way to limit population growth is to limit the LAVWMA pipeline and project capacity.

Measures To Enhance Transit. A special set of measures to enhance the viability of an existing transit system revolves around the central shopping and business district. Implementation of such means would be through the zoning code or formation of a special district.

- Special tax support of the transit system by businesses in recognition of the short-term increase in patronage as well as the long-term effect of strengthening the central area against suburban sprawl.

- Eliminate or lessen the minimum parking space requirement within the zoning ordinance.

- Substitute bus ticket validations or free bus tokens.

This set of measures would work well with the prior proposal to create pedestrian or non-auto malls in the central district.

There is great advantage for LAVWMA in this proposal because as the mechanisms could be established now and become operative when a bus system is established. It would thus represent a strong commitment with minimal risk.

Economic Measures. Many of the economic measures described are traffic disincentives or travel disincentives. This includes such measures as corridor access rationing which would include:

- Ramp metering which places the congestion on ramps and local streets rather than on freeways and causes the better utilization of the roadway system.

- Restriction of corridor capacity. This is the opposite attitude to expanding highway capacities as demand dictates.

- Limiting availability of gasoline or increasing gasoline prices.

Another area in which disincentives may be employed is in parking which strikes directly at the automobile as opposed to transit because, of course, there is no parking requirement for transit. Specific means to be employed include:

- Raising parking fees.

- Limiting the availability of parking.

- Limiting the time allowed in parking places.

Forms of taxing also constitute disincentives. Although there is no authority as yet, one could consider placing a commuter tax on non-locally employed residents or, on the other hand, placing a commuter tax on nonresident employees. Another means of taxing to discourage travel is to raise bridge tolls and to charge a higher toll in peak-hour travel times when congestion is worst, thus reducing the need for lane requirements on highways. Another means of taxation which would strike at travel in general would be a progressive tax on vehicle ownership, that is, the more cars owned by one person or one family unit or economic unit, the higher the tax for each additional car would be.

Many of these disincentives to the auto have their parallel in incentives to transit users.

- Tax credits or deductions for commuters who utilize transit.
- Tax credit or deduction for persons in car pools.
- Allowing parking advantages to car poolers at larger installations where this may be a benefit.

Fare structures may also constitute an incentive to use transit wherein a monthly fare may be charged as a family subscription regardless of the number of trips that are made. Commute passes are another means of enhancing transit. They have the advantage of reducing the impact of placing the fare in the box every morning and every afternoon, and place it on a par with the financing of private automobile ownership wherein the cost of each trip is not evident.

Institutional Measures. One institutional structure commonly connected with travel requirements is the standard 40-hour work week. Various means have been suggested to alter this pattern such as:

- Staggered work hours
- Shortened work week
- Flexible or gliding work hours.

While none of these may reduce the VMT, and in fact may increase them slightly, this would be offset by a reduction in projected emissions for this VMT due to decreased traffic congestion. The effect of staggered work hours on limiting car pooling potential is immediately obvious. Employer participation has been mentioned earlier in regard to car pooling advantages and van pooling. Employers who charge for parking may also wish to incorporate some of the economic disincentives into their parking fee structure. Lastly, the employers may exhibit a preference in hiring local residents when all other considerations are equal. Such practices should not run afoul of Equal Opportunity Employment laws.

A large, although indirect, potential for reducing auto dependency and increasing the viability of transit exists in advertising the advantages of bicycling and mass transit. Advertising the local transit service through institutions such as schools, hospitals, and entertainment centers presents an opportunity to enhance transit. Two specific means

would be to list yellow page business addresses in the telephone directory by bus route as well as street addresses. Another means within the recreation-type travel would be to include the cost of transit tickets to public-event tickets to encourage the use of transit to large gatherings.

Lastly, a very direct means for LAVWMA to implement as a means to reduce vehicle travel would be to annex the Livermore-Amador Valley to the Alameda-Contra Costa County Transit District. This move may be seen as an alternative to membership in the BARTD, as membership within BARTD is coming into question by some persons within the Valley.

Remaining Impacts

Impacts which will not be eliminated or reduced to an acceptable level cannot be identified until an acceptable program of mitigation measures has been established.

DETERMINATION OF SYSTEM DESIGN CAPACITY

LAVWMA has asked the SWRCB for approval to begin design of the facilities prior to certification of the EIS as a means to expedite the program. EPA has recognized that determination of design capacity prior to completion of the EIS process would eliminate the option of relating pipeline capacity to the level of unmitigated impacts and mitigation measures. However, if LAVWMA decides to determine capacity now, EPA has two more options: (1) approach the decision project design population as a yes/no decision, or (2) allow the design and construction of the pipeline but place grant conditions on allowed use. This second option allows for design and construction of pipelines at design capacity but would restrict pumps, wells, and other elements of the system to an initial approved capacity. This allows for a simple expansion to the design capacity at a later date.

All three options -- the tradeoff between impacts and mitigating measures, the yes/no position, and the limited use option -- are still available to LAVWMA and EPA.

OPTIONS AVAILABLE TO LAVWMA

A. Select design capacity after EIS is complete.

This option would allow public response to be a part of the decision. In addition, a design population can be chosen on the basis of the effectiveness of planned mitigation measures. This latter decision may be able to incorporate definitive action concerning the VCSD plant expansion and Las Positas New Town.

B. Select design capacity now.

There are several population levels open to LAVWMA at this date for which to select a design capacity. Attainment of air quality standards and implementation of mitigating measures will be far easier at the lower population levels. The option to select the population level at which air quality standards will be met is not an option available at this time as was illustrated in Figure 7. These population levels are lower than the present population levels.

1. Select design capacity for the present population.

This option would create the least impact on air pollution, and implementation of mitigation for this problem would be less challenging than for a larger population. Extra capacity at this population level should be allowed for commercial and industrial landuse.

2. Select design capacity for the "75 ratio" E-0 population.

Attainment of air quality standards would be slightly more difficult at this population level, but may be achievable with implementation of significant mitigating measures. This E-0 projection is one which distributes the growth evenly throughout Alameda County rather than distributing growth to the more outlying areas such as the Livermore-Amador Valley.

3. Select design capacity for the "Adjusted" E-0 population.

This option would create significant impacts on air quality and would require substantial VMT mitigation. Growth allowed under this option would be on the order of 40 percent of the present population.

4. Select design capacity for the LAVWMA low population.

This option necessitates the use of rigid regulations to control VMT and thereby preserve air quality. It allows for substantial growth on the order of 90 percent of present population levels to occur in the Valley, including the developments to which Pleasanton has committed itself.

5. Select capacity to meet local jurisdictions' stated needs.

This option would allow the growth that each community feels necessary. The larger capacity might also accommodate Las Positas or other large new developments. It would require a drastic reduction in VMT if air quality objectives are to be met.

OPTIONS AVAILABLE TO EPA

1. Fund the project at the capacity chosen by LAVWMA.

If a substantial amount of the adverse air quality impacts associated with the project is eliminated or minimized, the EPA could fund the project as described by LAVWMA.

2. Fund the project at a capacity lower than that chosen by LAVWMA.

If there were still a significant amount of adverse air quality impacts associated with the project following evaluation of all agreed-to-mitigation measures, EPA could suggest that LAVWMA either propose a smaller project or agree to limit use of the facilities until additional measures are implemented.

C. If LAVWMA selects a design capacity prior to completion of the EIS process, EPA has these options:

1. Fund the project at LAVWMA's chosen capacity.

This is the same as option A.1.

2. Fund the project at LAVWMA's chosen capacity, but limit use of the full capacity.

If there were still a significant amount of adverse air quality impacts associated with the project following evaluation of all agreed-to mitigation measures, EPA could suggest that LAVWMA agree to limit use of the facilities until additional measures are implemented.

D. If the preceding options were not acceptable to LAVWMA, EPA could:

1. Deny funding.

If there were still substantial adverse air quality impacts associated with the project following an

evaluation of all agreed-to mitigation measures and the preceding options were not acceptable to LAVWMA, EPA could deny funding for the project. This option would not meet water quality objectives because 100-percent local funding is unlikely.

BOND ELECTION

The LAVWMA Joint Powers Agreement established conditions that provision of facilities to accommodate greater than 13 MGD or the expenditure of more than $1.5 million would be submitted to the voters for approval. Present estimates of population and needed sewage treatment capacity, as well as the expected local share of project funding, indicate that LAVWMA will have to subject the project to voter approval. The LAVWMA project schedule is now directed toward placing this matter on the ballot for the November 2, 1976 general election.